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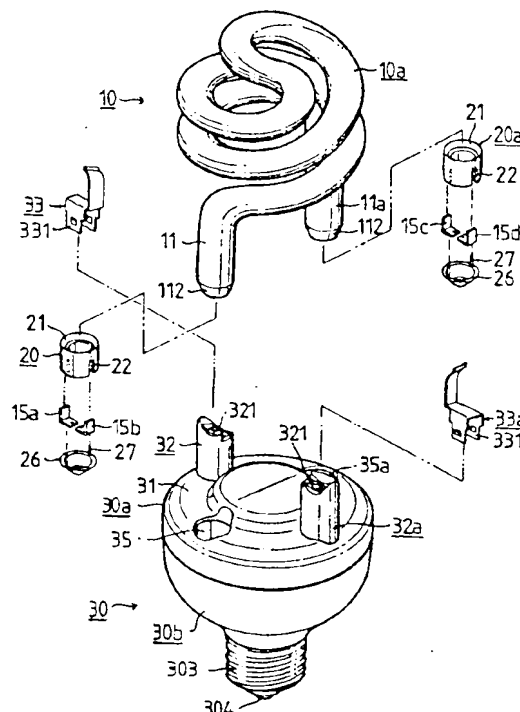
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(54) Title: DOUBLE SPIRAL COIL-TYPE TUBE FOR FLUORESCENT DISCHARGE LAMP AND BULB-TYPE FLUORESCENT LAMP DEMOUNTABLY HAVING THE TUBE

(57) Abstract

A double spiral coil-type tube for fluorescent discharge lamp and bulb-type fluorescent lamp demountably having its tube are disclosed in which shape of the tube made of a glass tube being used for a bulb-type fluorescent lamp, slide connection terminals base elements, leading-in wires and a discharge electrode are mounted on an upper section. Support rods demountably supporting said fluorescent discharge lamp and stators are mounted on the upper section. Insertion inlets for lead tubes of the fluorescent discharge lamp is also passed through the upper section. In the lower section, there are upper case composed of discharge parts and electrode terminals connected to slide connection terminals of lead tubes put into the insertion inlets. And the lower case includes a spiral tube and stem electrode put into a spiral power socket in the lower part, and is assembled to be in gear with the above upper case to form a body of bulb-type fluorescent lamp.



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Double Spiral Coil-Type Tube for Fluorescent Discharge Lamp and Bulb-Type Fluorescent Lamp Demountably having the Tube.

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TECHNICAL FIELD

The present invention relates to a bulb-type fluorescent lamp and particularly to the improved tube for fluorescent discharge lamp and bulb-type fluorescent lamp demountably having such improved tube.

BACKGROUND ART

A bulb-type fluorescent lamp comprises a tube for fluorescent discharge lamp having the types of curved tube-shape, coil-shape and U-shape such that interchangeable installation between spiral type socket and incandescent lamp can be achieved by applying the characteristic of straight pipe-type fluorescent discharge lamp having high efficient illumination(lm/w), which was developed to heighten energy saving effect and ornamentation.

There are several conditions for comprising bulb-type fluorescent lamp having its commercial value. First of all, appearance of the fluorescent discharge lamp shall be formed with beautiful appearance and miniaturized standard of a hemispherical form similar to the incandescent lamp type. And it shall have an appropriate intensity of illumination which corresponds to the incandescent lamp, and it shall be mass-produced.

There were provided with many kinds of the conventional bulb-type fluorescent lamp which meets the

aforementioned requirements. However, miniaturization requirements of the fluorescent discharge tube, maximization requirements of its intensity of illumination and automatization requirements of its productivity according to technical characteristics of a fluorescent lamp were in conflict one another. That is, no commercial products which all the conditions are satisfactorily met were provided.

Reviewing construction of the tube for fluorescent discharge lamp used in the various bulb-type fluorescent lamp so far, there was adopted with glass tube having the diameter of about 14mm in which illumination efficiency is maximized by the prior art, and having the curved tube-shape, coil-shape, U-shape and double U-shape.

The above described tube having such construction meets some requirements of minimization having standard similar to the incandescent lamp, beautiful appearance and automatization, of the requirements for constructing the tube for the fluorescent discharge lamp having commercial value.

However, a total length of the tube for achieving the maximization of illumination in proportion to discharge field is restricted in view of the aforesaid tube shape and within the capacity similar to the incandescent lamp. Consequently, it has the drawback which high intensity of illumination cannot be obtained. Especially in case of the tube having U-shape and double U-shape, as it shall be formed lengthwise to obtain appropriate discharge field, it had the drawback which appearance shall be formed with voluminous and lengthy irregular shape.

Further, most of the bulb-type fluorescent lamp adopting the fluorescent discharge lamp having the

aforesaid characteristics has the construction in which leading-in tubes on both sides of the aforesaid tube are fixed on a base element of a body of the bulb-type fluorescent lamp, while the straight tube-type fluorescent lamp is constructed such that the tube is formed with the straight tube-type cylinder, two electrode pins are mounted on both ends, and thus the body of the fluorescent lamp can be exchanged with the rotary socket-type. Accordingly, in the event that a fluorescent discharge lamp is broken down or its intensity of illumination declines, high-priced bulb-type fluorescent lamp shall be exchanged with the new one on the whole instead of exchanging the fluorescent discharge lamp only. Consequently, it had the drawbacks of wasting resources, and causing consumers to have increased economical burden and declined consumption desire.

DISCLOSURE OF INVENTION

The present invention is provided to eliminate the drawbacks which the above described conventional various bulb-type tubes for the fluorescent lamp have, and the drawbacks of the fluorescent lamp employing such tube.

The first object of the present invention is to provide a tube for the fluorescent discharge lamp in which the shape of the bulb-type tube for the fluorescent lamp is subminiaturized to be within the capacity similar to the incandescent lamp, and high intensity of illumination is obtained by largely extending the total length of the tube as well.

The second object of the present invention is to

provide the tube for fluorescent discharge lamp which is of high ornamentation, and has a visual sense of security and beautiful appearance shown in any direction, by forming the outer appearance of the tube for fluorescent lamp with the symmetrical shape from all directions, which is not onesidedly long or broader.

The third object of the present invention is to provide construction of high productivity in which the tube for fluorescent lamp can be mass-produced with the mold and automatic forming equipment.

The fourth object of the present invention is to provide the cost-reduction tube in which the tubes having various sizes can be produced with the one production process in one lot, by adjusting at one's option the total length of the tube for fluorescent lamp tube using one mold in the production process.

The fifth object of the present invention is to provide the quality tube in which intensity of illumination is increased due to high projection area of luminous flux within the equal consumption power and the equal tube size.

The sixth object of the present invention is to provide a bulb-type fluorescent lamp of an exchangeable fluorescent discharge tube in which double spiral coil-type fluorescent discharge tube having the aforesaid construction is demountably attached to the body of the fluorescent lamp.

To achieve the aforesaid objects, the present invention comprises a tube for fluorescent discharge lamp made of glass tube being used in the bulb type fluorescent lamp having the double spiral coil-type, electrode

terminal of inner leading-in tube and several connection terminals respectively connected thereto being fixed with base element in the leading-in tube on both ends of the fluorescent discharge lamp having such double spiral coil-type tube, a supporting device demountably holding lower end of the aforesaid fluorescent discharge lamp in the body of the bulb-type fluorescent lamp, and a demountable type electrode connection device which is demountably connected with a slide connection terminal being fixed on the base element and at the same-time discharge current is interrupted.

The other objects and effects of the present invention will be apparent with reference to the accompanied drawings and its explanation.

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BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is an exploded perspective view of a bulb-type fluorescent lamp according to one example of the present invention.

FIG. 2 is an assembly end view of the bulb-type fluorescent lamp according to one example of the present invention.

FIG. 3 is a perspective view of a double spiral coil-type tube according to one example of the present invention.

FIG. 4 is a plan view of the double spiral coil-type tube according to the present invention.

FIG. 5 is a side elevation view of the double spiral coil-type tube according to the present invention.

FIG. 6 is a cross-sectional view taken on line A-A of FIG. 4.

FIG. 7 is a side elevation view illustrating the tube according to the other example of the present invention.

FIG. 8 is a side elevation view illustrating the tube according to another example of the present invention.

5 FIG. 9 is an enlarged end view illustrating a base element of fluorescent discharge lamp according to the present invention.

FIG. 10 is a cross-sectional view taken on line B-B of FIG. 9.

10 FIG. 11 is a plan view illustrating an upper case of a fluorescent discharge lamp body.

FIG. 12 is a cross-sectional view taken on line C-C of FIG. 11.

15 FIG. 13 is a cross-sectional view taken on line D-D of FIG. 11.

FIG. 14 is a bottom view of the upper case of a bulb-type fluorescent lamp body.

20 FIG. 15 is an enlarged extracted bottom view illustrating connection between an electrode terminal of a supporting structure and a fluorescent discharge lamp.

FIG. 16 is an extracted perspective view illustrating the electrode terminal and support rods.

25 FIG. 17 is an extracted vertical section illustrating construction between the electrode terminal of the supporting structure and the fluorescent discharge lamp.

FIG. 18 is a section view illustrating assembly of an upper case and a lower case.

30 FIG. 19 is a partially extracted section view illustrating partial portion of assembly of the upper case and the lower case.

FIG. 20 is a circuit diagram of the bulb-type fluorescent lamp according to the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION/
INDUSTRIAL APPLICABILITY

Fig. 1 is an exploded perspective view of a bulb type
5 fluorescent lamp according to one example of the present
invention and Fig. 2 is an assembly end view of the bulb-
type fluorescent lamp according to one example of Fig. 1.

This bulb-type fluorescent lamp is composed as
follows. A fluorescent discharge lamp 10 having a double
10 spiral coil-type tube 10a, slide connection terminals 15a,
15b, 15c, 15d, base elements 20, 20a, leading-in wires and
a discharge electrode 18 are mounted on an upper section
31. Support rods 32, 32a demountably supporting said
fluorescent discharge lamp 10 and stators 33, 33a are
15 mounted on the upper section 31. Insertion inlets 35, 35a
for lead tubes 11, 11a of the fluorescent discharge lamp
10 is also passed through the upper section. In the lower
section, there are upper case 30a composed of discharge
parts and electrode terminals 36a, 36b, 36c, 36d connected
20 to slide connection terminals 15a, 15b, 15c, 15d of lead
tubes 11, 11a put into the insertion inlet 35, 35a. And
the lower case includes a spiral tube 303 and stem
electrode 304 put into a spiral power socket in the lower
part, and is assembled to be in gear with the above upper
25 case 30a to form a body of bulb-type fluorescent lamp.

Fig. 3 is a perspective view illustrating a double
spiral coil type tube 10a according to one example of the
present invention, and Figs. 4 and 5 are its plan view and
side elevation view, respectively. Fig. 6 is a cross-
30 sectional view taken on line A-A of Fig. 4.

For the double spiral coil-type tube 10a, a glass
tube with a small diameter is bent first with a downward

angle to the semicircle 12, 12a shape of a small diameter(D_a) from the top center in the right and left direction each other and rolled up around the large circumference 14, 14a of the large diameter(D) totaled by
5 two small diameters of two semicircle 12, 12a. And it forms a double spiral coil tube and both ends of the tube are bent downward parallel to the center line of the coil tube in a symmetrical location to be formed to lead tubes 11, 11a.

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For the above lead tubes 11, 11a, as illustrated in Fig. 1, Fig. 2 and Fig. 9, each lower part is made cone-shape downward step, closed up inside, lifted upward and sealed to be formed stems 16, 16a. In these stems 16,
15 16a, two leading-in wires 17, 17a are mounted for each stem at an interval, left and right discharge electrodes are mounted inside the tube, and fluorescent material is applied inside wall of the double spiral coil-type tube 10a.

20 In the left and right lead tubes 11, 11a of the double spiral coil-type tube 10a, base elements of plastic ring shape adhered to the cone-shape downward step 112 are adhered by adhesives. Conductible slide connection terminals 15a, 15b, 15c, 15d are assembled and mounted on
25 both right and left side of base elements 20a to connect with the above lead wire 17, 17a inside and connect outside with electrode terminals 36a, 36b, 36c, 36d mounted in the upper case 30a described later.

The assembly structure of the above base elements 20,
30 20a and slide connection terminals 15a, 15b, 15c, 15d is as follows according to Fig. 1, 2, 9 and 10. In each base subsidiary material 20, 20a, connecting grooves 22 are

made outside in both right and left direction and terminal insertion grooves 23 connected to the connection grooves 22 are made. In the lower part of these terminal insertion grooves 22, step jaws 24 are formed inside, so
5 L-type slide connection terminals are inserted to be pressed from lower side to upper side by the terminal insertion grooves 23. And the outside of the slide connection terminal 15a, 15b, 15c, 15d are exposed to outside through each connection groove 22 and the inside
10 is soldered with the leading-in wires 17, 17a mounted on the right and left stems 16, 16a for assembly.

In the one side of those right and left base elements 20, 20a, two fixation holes 25 are formed for each side, so mushroom-type caps 26 are inserted into the above
15 fixation holes 25 tightly with each fixation pin 27 for assembly. As described above the structure of bulb-type fluorescent lamp body 30 becomes the sphere shape composed of the upper and lower case 30a, 30b in which the base elements 20, 20a are attached in the lower part of the
20 both-end lead tube 11, 11a of the double spiral coil-type tube, the fluorescent discharge lamp 10 is demountably supported in this base elements 20, 20a with the slide connection terminals 15a, 15b, 15c, 15d connected to the both end of the discharge electrodes 18, and the power
25 circuit is connected.

The structure of the upper case 30a is as follows in accordance with Fig. 1, 2, 11, 16 and 18. In the edge of the upper section 31, support rods 32, 32a are mounted vertically with two assembly holes 321 made from the upper
30 part to inside to support the fluorescent discharge lamp 10 in symmetrical location, and in the upper part of these right and left support rods 32, 32a, the right and left

stators 33, 33a of hook-type metal plate to hold the spiral lower part of the fluorescent discharge lamp 10 into circular arc side with elasticity are inserted for installation through assembly into each assembly holes 321 in the upper part of the above support rod 32, 32a by two loop-type assembly pieces 331 mounted in the lower part.

In the edge of the upper section 31 located symmetrically crosswise to those support rods 32, 32a, circular insertion inlets 35, 35a penetrate the upper section 31 vertically to insert both-end base elements 20, 20a of the fluorescent discharge lamp 10.

In the front and rear area of the lower section of those insertion inlets 35, 35a, support stands 37a, 37b, 37c, 37d are mounted in each insertion inlets 35, 35a to support 4 electrodes 36a, 36b, 36c, 36d connected to the slide connection terminals 15a, 15b, 15c, 15d mounted in the above base elements 20, 20a.

Those support stands 37a, 37b, 37c, 37d are, as illustrated in Fig. 12-16, mounted vertically in the front and rear in the lower part of the upper case 30a opposite each other, stand opposite elastically with a gap. In each inside of the stand, inside grooves are made thin vertically opposite to the center of the insertion inlets 35, 35a and in each outside stand, a little larger outside grooves 372 are made contrary to the above inside grooves 371.

The electrode terminals 36a, 36b, 36c, 36d mounted in the above support stands 37a, 37b, 37c, 37d are made of conductible plate, and composed, as illustrated in Fig. 15-17, long sliding insertion element 361, connection materials 362 bent perpendicularly to the vertical hem of that insertion elements 361, and wire-pressing element 363

bent to the rear from the middle of the insertion element 361.

Those electrode terminals 36a, 36b, 36c, 36d are made symmetrical shape by two units as illustrated in Fig. 15 to be inserted into and supported by each support stands 37a, 37b, 37c, 37d from each insertion inlet 35, 35a to center symmetrically. Connection elements 362 are inserted into inside grooves 371 and pressure elements 363 are joined with outside grooves 372 and each insertion elements 361 are inserted into the gap of two stands under pressure to be assembled.

In the situation that the above electrode terminals 36a, 36b, 36c, 36d are inserted in the support stands 37a, 37b, 37c, 37d, the connection elements 362 of each electrode terminal are made forward in a little projecting standard and the pressing elements 363 are made backward a little projectingly.

The upper case 30a and the lower case 30b respectively becomes hemisphere shape produced from spherical bulb-type fluorescent body 30 by dividing in a proper standard, and, as illustrated in Fig. 13, 14 and 19, several assembly grooves 301 are made in the lower inside of the upper case 30a and several inserting projection pieces 302 put in the above assembly grooves 301 are formed in the upper inside of the lower case 30b to be assembled in gear.

In the lower part of the above mentioned lower case 30b, a metal spiral tube 303 for the insertion in a spiral power socket is assembled and several pressing rods 305 are mounted inside to press the lower part of the support stands 37a, 37b, 37c, 37d of the above upper case 30a and prevent the electrode terminals 36a, 36b, 36c, 36d from

bolting.

The above described bulb-type fluorescent lamp body 30 is formed as follows. In the lower part of the upper case 30, a voltage transformer 41 and a starter tube 42 are mounted as parts of publicly-known discharge circuit, and as illustrated in Fig. 20, wiring is carried out through the publicly-known fluorescent lamp discharge circuit as below. One-side terminal of the voltage transformer 41 is connected to the spiral tube 303 and the other-side terminal is connected to the electrode terminal 36b of the one-side support stand 37a. One-side terminal of the starter tube 42 is connected to the electrode terminal 36b of the support stand 37b and the other-side terminal is connected to the electrode terminal 36c of one-side support 37c. The stem electrode 304 of the spiral tube 303 is connected to the electrode terminal 36d of the support stand 37d.

One example of the present invention comprising the fluorescent discharge lamp 10 and the bulb-type fluorescent lamp body 30 having the above constructions is explained in the following. While attached base elements are inserted in two lead tubes 11, 11a, a fluorescent discharge lamp 10 is inserted vertically in the insertion inlets 35, 35a formed on the upper section 31 of the upper case of bulb-type fluorescent lamp body 30. And then lower part of the spiral tube of the fluorescent discharge lamp 10 elastically unfolds vertical hems of the stators of right and left support rods 32, 32a mounted in one side of the upper section of upper case, and is fixed in the inside circular arc step of the stators 33, 33a. And as illustrated in Fig. 13, the stators 33, 33a hold the lower inside step of the spiral tube of the fluorescent

discharge lamp 10 by material elasticity to fix and support it to the upper section of upper case. The fixation of the fluorescent discharge lamp means that the base elements 20, 20a, both ends of two lead tubes 11, 11a
5 inserted in the insertion inlets 35, 35a, are inserted between two support stands 37a, 37b and other two support stands 37c, 37d mounted opposite inside the insertion inlet 35, 35a, therefore as illustrated in Fig. 2, 15 and 17, wiring is as follows. Two slide connection terminals
10 15a, 15b, mounted in terminal insertion grooves 23 in exposed condition in the right and left connection grooves 202 of one-side base element 20 are connected to the connection elements of electrode terminals 36a, 36b inserted in inside grooves 371 of one-side support stands
15 37a, 37b, and slide connection terminals 15 of other-side base elements 20a are respectively connected to the electrode terminals 36c, 36d mounted in other-side support stands 37c, 37d in the same structure as mentioned above to be a bulb-type fluorescent lamp of fluorescent
20 discharge lamp demountably connected completely to the discharge circuit mounted inside bulb-type fluorescent lamp body.

The operational effects are explained in the following. According to the structure of the example
25 described above for the present invention, a glass tube with a small diameter is bent primarily with a downward angle to the semicircle 12, 12a shape of a small diameter(D_a) from the top center in the right and left direction respectively and rolled up around the large
30 circumference 14, 14a of the large diameter(D) totaled by two small diameters of two semicircle 12, 12a, and then it forms a double spiral coil tube, therefore the effects are

as bellows. The tube can be manufactured by roll-up molds and automatization lines, so standardization and mass production on the basis of quality control is possible. And in case of the use of roll-up molds with different
5 length and diameter in the same system, the adjustment of roll-up diameter, number of production times and diameter is easier, so it is possible to have high productivity to provide the products of various standards by model and specification. In respect of the tube quality, total
10 extension length of the tube possible to be made in the same volume can be largely increased in comparison to existing coil-type, U-type and double U-type tubes, therefore in case of the limitation of total volume of tubes to a certain volume, illumination can be increased
15 as much as the length is extended. In case of standard value with the same illumination on the contrary, roll-up diameter or number of production times can be reduced to minimize the size of tube.

In view of external appearance, a major requirement
20 of commodity value, tube shape is formed as double-spiral, symmetrical and cylindrical coil-type at all sides with smooth oblique line, so the exterior view is more smooth than that of existing one and shows more beautiful effect of safety image. And each spiral tube rolled up as
25 totally cylindrical and double spiral coil-type with smooth oblique line is rolled-up in opposite direction from the counter part tube, so beam projection side is widely formed in the same tube way to achieve the prominent improvement of illumination.

30 The fluorescent discharge lamp 10 is formed by the use of special double spiral coil-type tube, attachment of base elements 20, 20a on the lower part of lead tubes 11,

11a, and preparation of slide connection terminals 15a, 15b, 15c, 15d connected to both ends of discharge electrodes 18 in the base elements 20, 20a. The body of bulb-type fluorescent lamp 30 becomes sphere shape composed of assembly type upper and lower cases 30a, 30b. A spiral tube and stem electrode to be inserted in the spiral power socket is mounted in the lower part of lower case 30b. Inside the upper case 30a, publicly-known structure with discharge parts including voltage transformer 41 and starter tube 42 is prepared. The above fluorescent discharge lamp 10 is supported demountably. In the upper section 31 of upper case 30a, two support rods 32, 32a are mounted vertically and symmetrically in the edge. In the upper section of these support rods 32, 32a, right and left hook-type stators 33, 33a are mounted by assembly to hold the lower part of spiral tube of the fluorescent discharge lamp 10 to circular arc side with elasticity. In the symmetrical edge to support rods 35, 35a by cross-type, insertion inlets 35, 35a are passed through upper section 3 vertically to insert the lead tubes 11, 11a of the above fluorescent discharge lamp 10 and the base element. In front and rear directions of lower part of the insertion inlets 35, 35a, support stands 37a, 37b, 37c, 37d are made in the lower part of the upper case 30a respectively, and in those support stands 37a, 37b, 37c, 37d, 4 electrode terminals 36a, 36b, 36c, 36d are mounted to connect with publicly-known discharge circuit for fluorescent discharge lamps. When base elements 20, 20a in the lower part of lead tubes 11, 11a of the upper case 30a, especially slide connection terminals 15a, 15b, 15c, 15d connected automatically with the discharge electrode 18 of fluorescent discharge lamp

can be tightly connected under pressure with electrode terminals 36a, 36b, 36c, 36d connected with the discharge circuit. Accordingly the bulb-type fluorescent lamp of the present invention with the above characteristics is
5 formed of the fluorescent discharge lamp 10 and the fluorescent lamp body 30 separately, therefore when the fluorescent discharge lamp 10 is pushed into insertion inlets 35, 35a from the upper section 31 of the upper case 30a, the electric power circuit of fluorescent lamp is
10 automatically connected and forms bulb-type fluorescent lamp with characteristics of demountable type.

In case of failure or damage of the fluorescent discharge lamp 10 during use, the damaged fluorescent discharge lamp 10 can be easily removed from the upper
15 case 30a by pulling up of damaged fluorescent hook-type stators 33, 33a of right and left support rods 32, 32a that support the fluorescent discharge lamp 10 to the upper section 31 of the upper case 30a. And after that, new fluorescent discharge lamp 10 can be assembled again,
20 therefore corresponding resource saving and economic benefit can be obtained, compared with existing bulb-type fluorescent lamp of fixed tube in which fluorescent discharge lamp and the body is fixed together, so good body and interior parts of high price should be exchanged
25 together while damaged or disconnected. And also all parts and components of this invention are made for assembly, so there are characteristics that high productivity can be obtained through automatization lines in view of manufacturing side that produces bulb-type
30 fluorescent lamps.

For example, instead of the structure in which a tube is bent primarily with a downward angle to the semicircle

12, 12a shape of a small diameter(D_a) from the top in the right and left direction respectively, and rolled up around the large circumference 14, 14a of the large diameter(D) totaled by two small diameters of two
5 semicircles, and forms a double spiral coil type, it has the same characteristics that as illustrated in Fig. 7, the large circumference 14, 14a connected with two semicircle 12, 12a of small diameter(D_a) is made larger and larger gradually, and changed into a double spiral
10 cone-shape tube 10b that is rolled up around the cone-shaped cylinder several times 114, 114a.

The structure, in which both ends of the tube are bent downward parallel to the center line 9 of the coil tube in a symmetrical location to be formed to lead tubes
15 11, 11a, can be used as a recommended structure for bulb-type fluorescent lamp in respect of the assembly of body and the optimization of volume, but as illustrated in Fig. 8, tubes can be changed to projected lead tubes 110, 110a by making both ends of the several times-rolled tube
20 extended from any symmetric point to a straight line or an oblique line and several tubes can be connected together consecutively in the right and left direction to be used for decoration, display or the mode that has large-scale fluorescent lamp or straight line shade and body.

25 And also instead of the structure of bulb-type fluorescent lamp 36 in which, as described in the above example, in the edge of the upper section 31 of the upper case 30a, right and left support rods 32, 32a support the fluorescent lamp 30 in a symmetrical location and right
30 and left stators 33, 33a are mounted in the upper part of the right and left support rods 32, 32a, plastic material can be substituted for metallic material and new structure

may be formed similar to the shape of the above right and left stators 33, 33a with a hook-type that holds the spiral tube of lower part of the fluorescent discharge lamp 10 from inside by circular arc mode during replacement operation of the fluorescent discharge lamp 10.

WHAT IS CLAIMED IS :

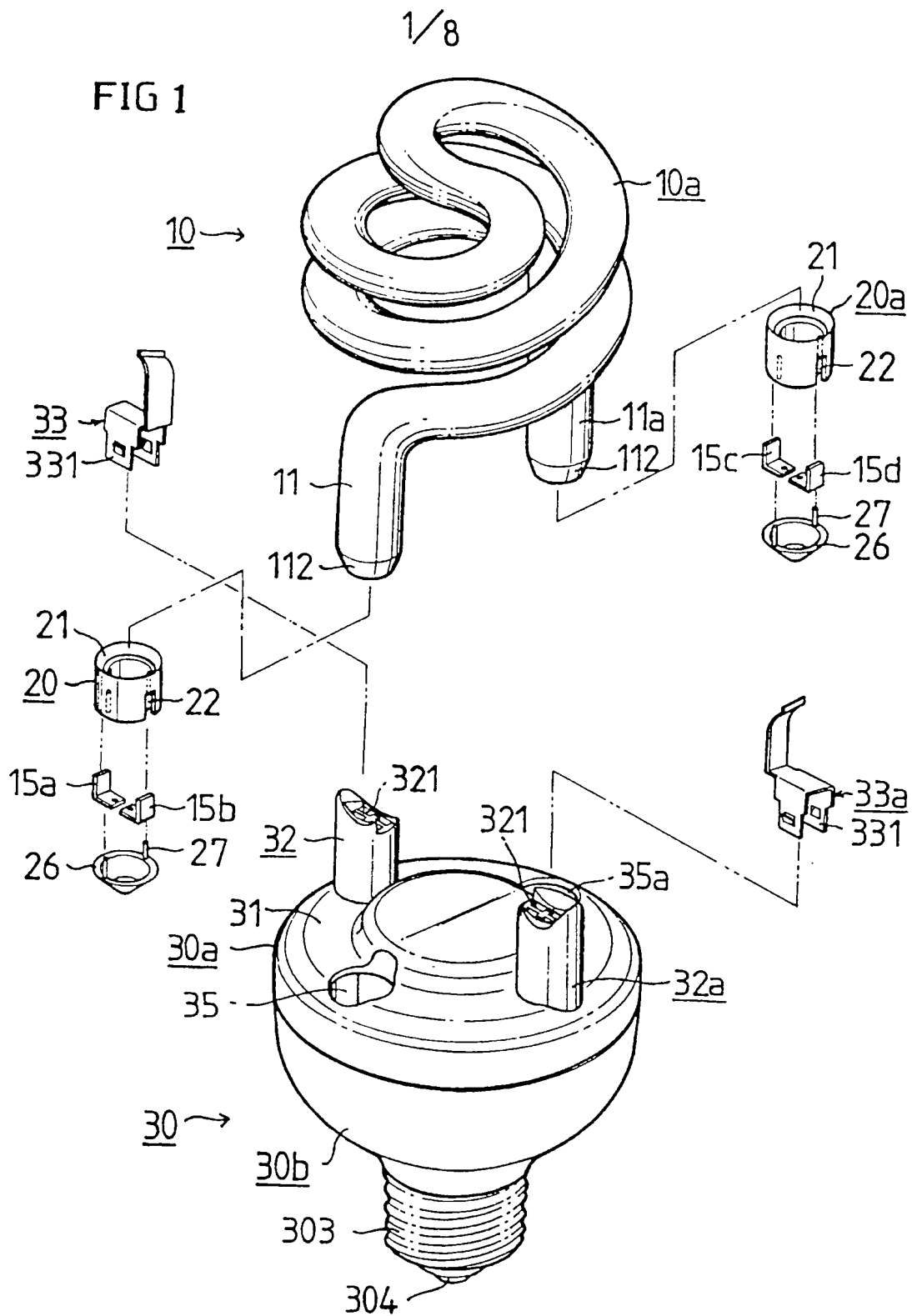
1. A double spiral coil-type tube for fluorescent discharge lamp, which comprises a glass tube with a small diameter being bent primarily with a downward angle to the semicircle 12, 12a shape of a small diameter(D_a) from the top center in the right and left direction individually and rolled up around the large circumference 14, 14a of the large diameter(D) totaled by two small diameters of two semicircle 12, 12a, wherein both ends of said tube are bent downward parallel to the center line(D) of the coil tube in a symmetrical location to be formed to lead tubes 11, 11a.
2. A double spiral coil-type tube for fluorescent discharge lamp, as set forth in Claim 1, which comprises a double spiral cone-shaped tube 10b being primarily bent with large circumference 14, 14a connected with two semicircle 12, 12a of small diameter(D_a) being made larger and larger gradually, and being rolled up around the cone-shaped cylinder several times 114, 114a.
3. A double spiral coil-type tube for fluorescent discharge lamp, as set forth in Claim 1, which comprises lead tubes 110, 110a formed at the both ends of double spiral coil tube being extended to projected lead tubes 110, 110a by the extension from any symmetrical point located at the lower part of large circumference 14, 14a to outside with angles other than the center line 9 and parallel perpendicular line.
4. A bulb-type fluorescent lamp equipped with double

spiral coil-type tube, which demountably comprises in the vertical hems of right and left lead tubes 11, 11a, ring-type base elements 20, 20a being attached, in each base elements L-type slide connection terminals 15a, 15b, 15c, 5 15d pushed into a connection groove 22 opened outside in right and left direction and the pierced terminal insertion groove 23 outside and connected to the above leading-in wires 17, 17a inside respectively, bulb-type fluorescent lamp body 30 being sphere-shaped and composed 10 of upper and lower cases 30, 30a for assembly, wherein said demountable support structure for said fluorescent discharge lamp 10 comprising in the upper section 31 of upper case 30a, two support rods 32, 32a being mounted at the edge in a symmetrical position, in said upper part of 15 support rods 32, 32a, right and left stators 33, 33a of hook type being mounted by assembly to hold lower part of the spiral tube of fluorescent discharge lamp 10 with elasticity, in the edge of the upper section symmetrical to said support rods 32, 32a by cross type, lead tubes 11, 20 11a of said fluorescent discharge lamp 10 and insertion inlets 35, 35a in which base elements 20, 20a are inserted being vertically pierced from upper section 31 to lower section, in the front and rear direction of lower section of the insertion inlets 35, 35a, support stand 37a, 37b, 25 37c, 37d being mounted in the lower part of upper case 30a respectively, in the support stands 37a, 37b, 37c, 37d, 4 electrodes 36a, 36b, 36c, 36d connected to publicly-known discharge circuit for fluorescent discharge lamp being mounted for the slide connection to slide connection 30 terminals 15a, 15b, 15c, 15d when base elements 20, 20a are inserted respectively, and inside a lower case 30b, several pressure rods 305 being mounted to press the lower

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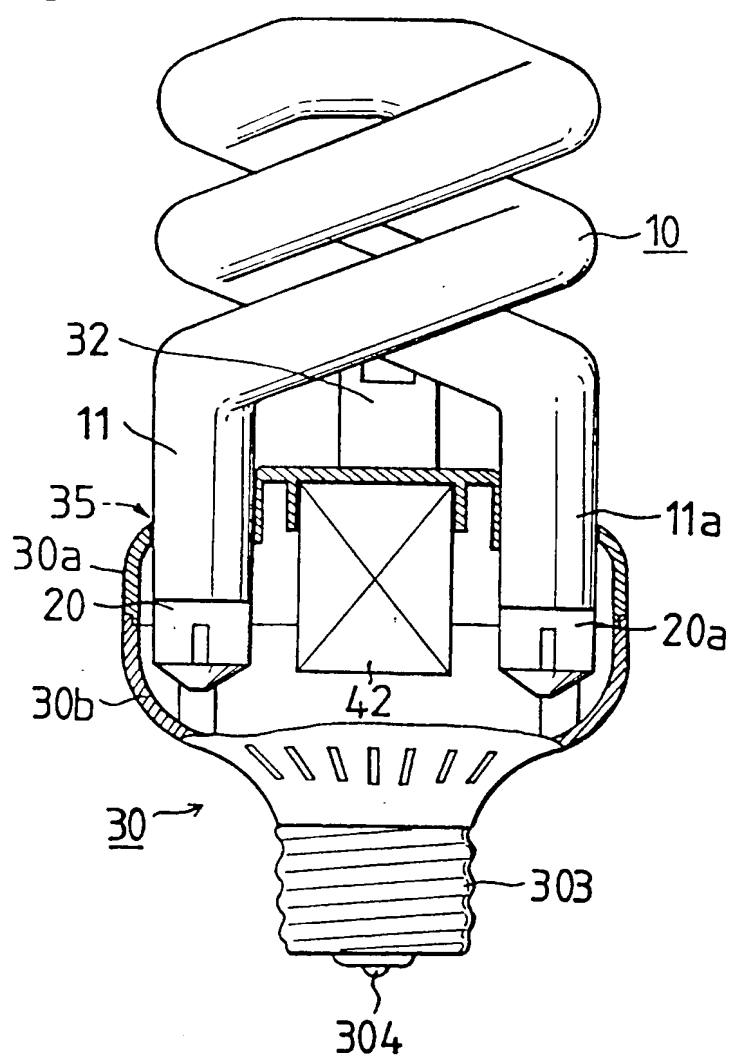
part of support stands 37a, 37b, 37c, 37d.

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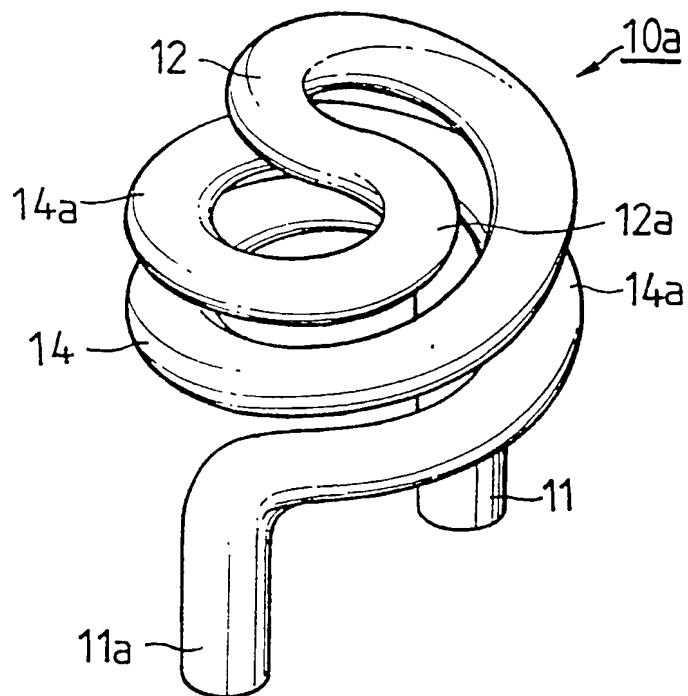
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FIG 2

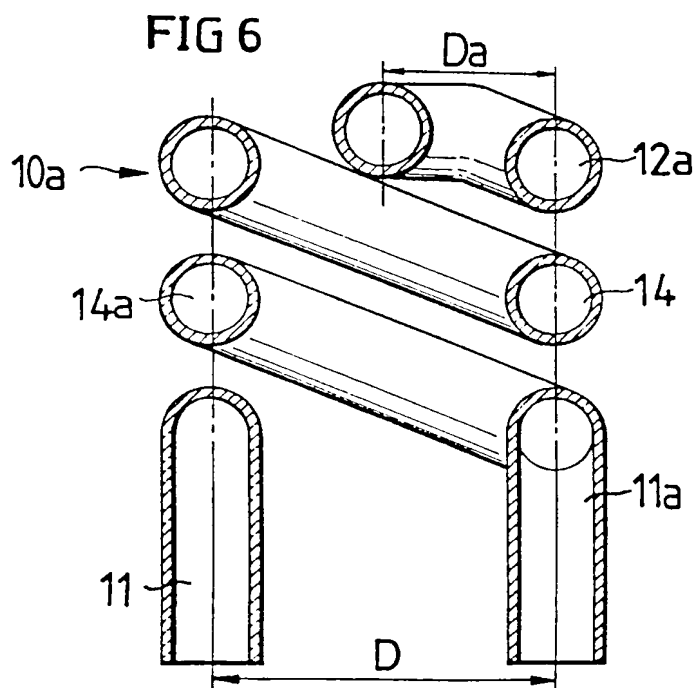
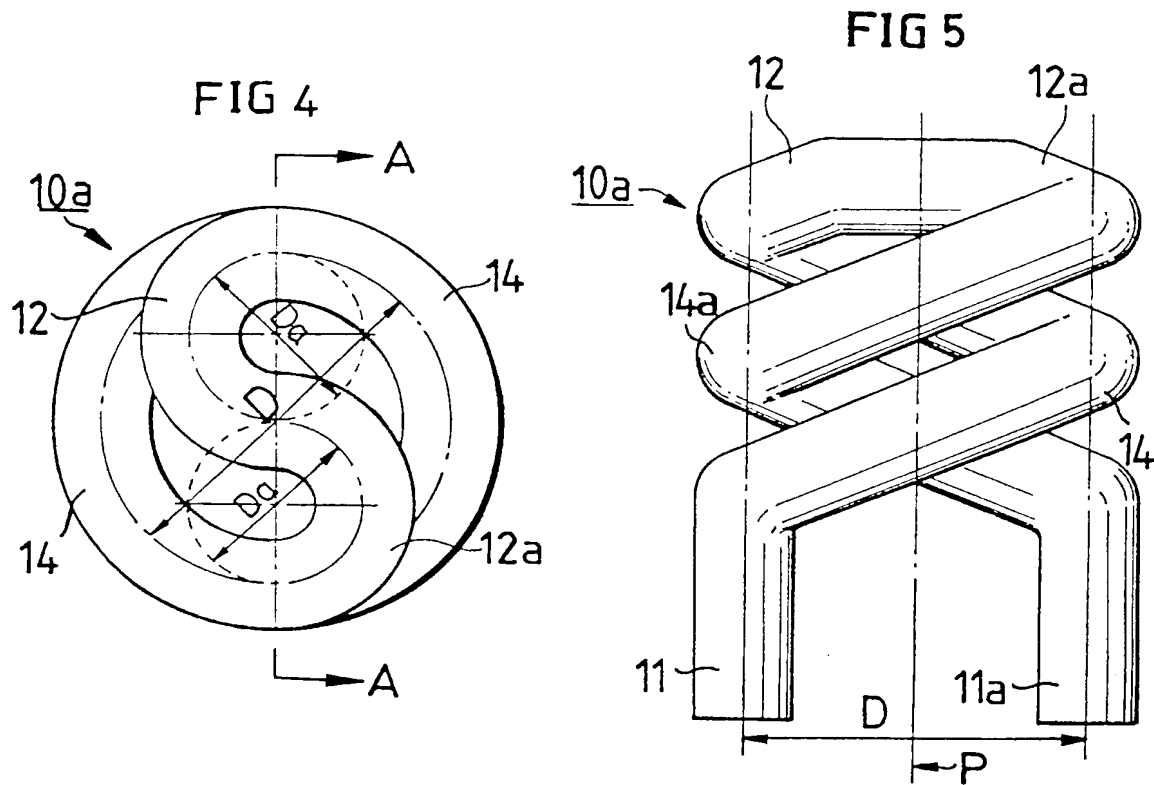


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FIG3



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FIG 7

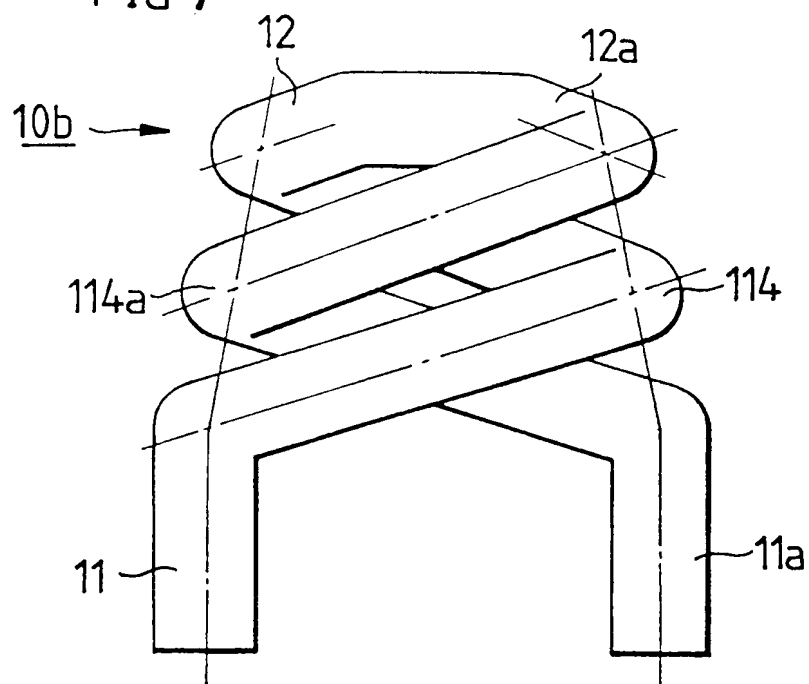
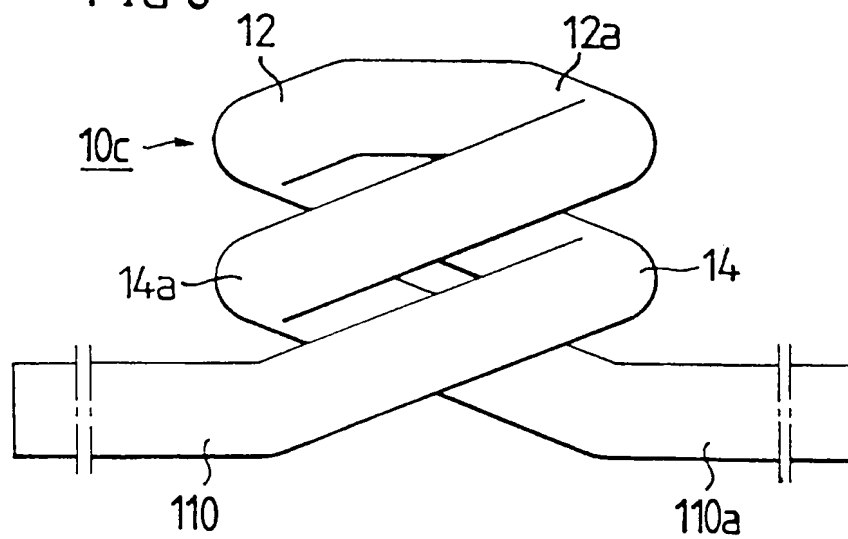


FIG 8



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FIG 9

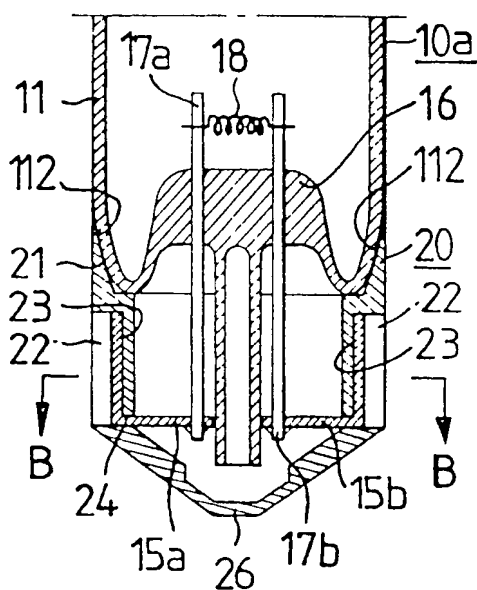


FIG 11

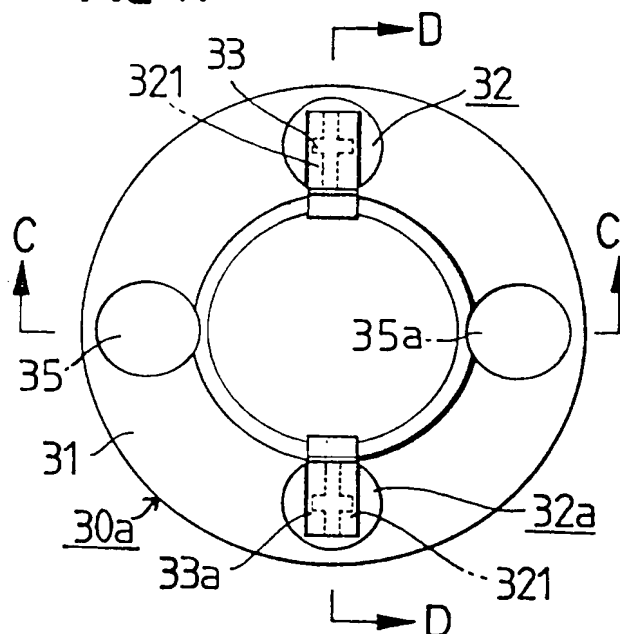


FIG 10

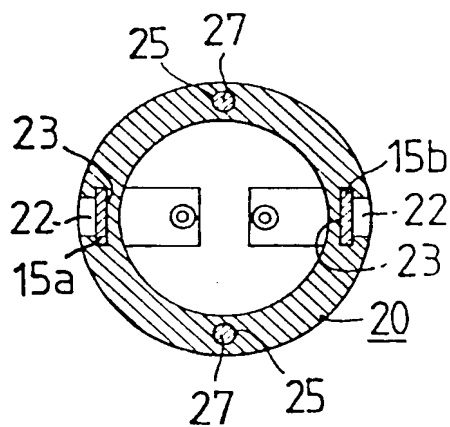
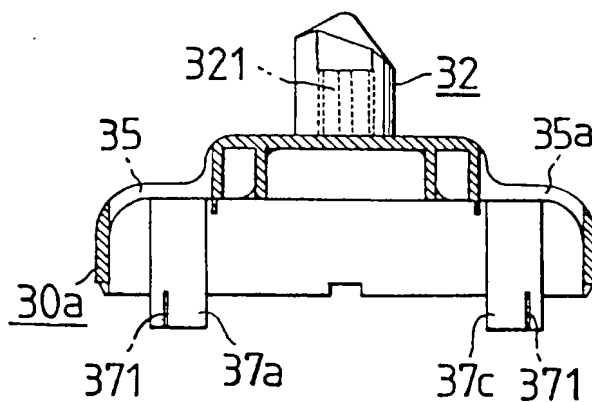


FIG 12



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FIG 13

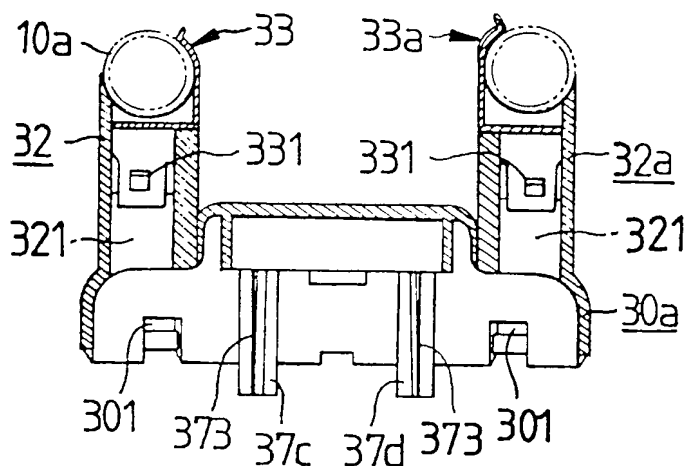


FIG 15

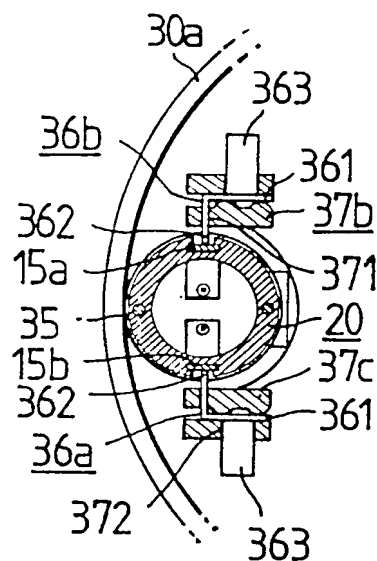


FIG 14

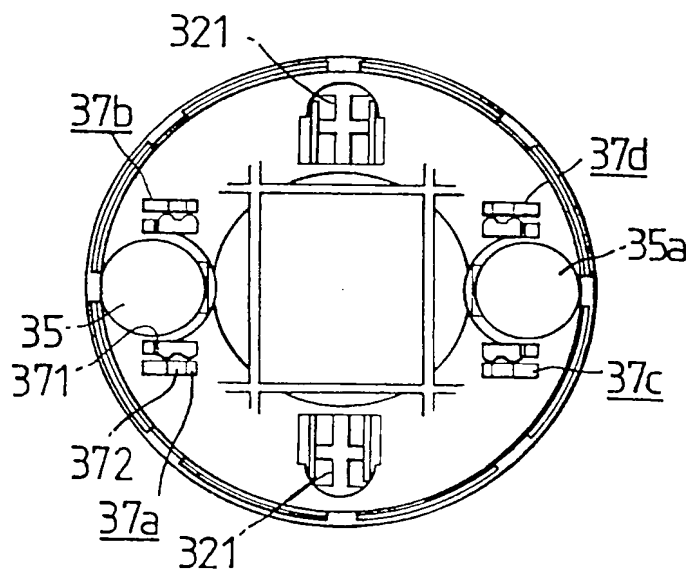
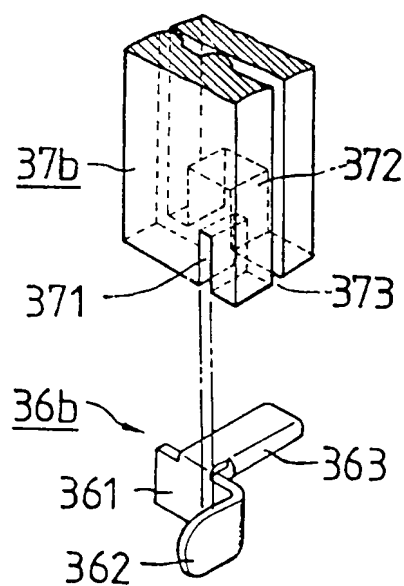


FIG 16



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FIG 17

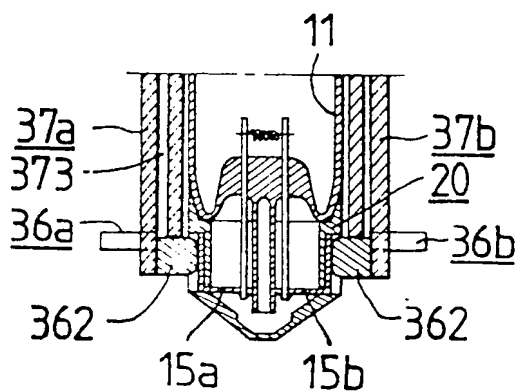


FIG 18

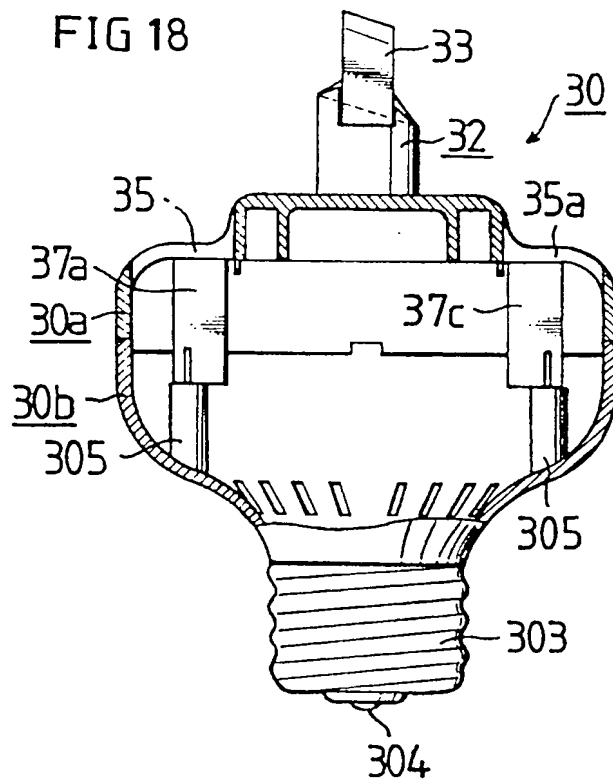


FIG 19

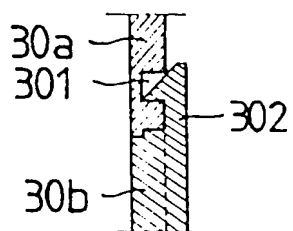
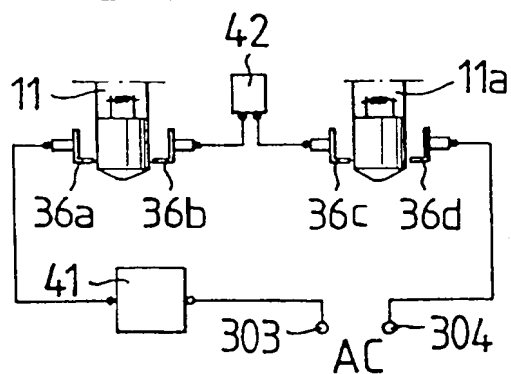


FIG 20



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR 94/00072

A. CLASSIFICATION OF SUBJECT MATTER		
IPC ⁵ : H 01 J 61/30, 5/50		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC ⁵ : H 01 J		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
WPIL		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	DE, A, 4 121 281 (HOLZER) 07 January 1993 (07.01.93), column 1, lines 41-66; fig.1	1 4
X Y A	DE, A, 4 027 783 (HOLZER) 30 April 1992 (30.04.92), column 2, lines 54-66; fig.5,6 claim 1	1 2,3 4
Y	DE, C, 839 975 (ZÖRNER) 26 May 1952 (26.05.52), page 2, lines 31-36; fig.2	2
Y	DE, A, 2 724 528 (KAWAMURA) 14 December 1978 (14.12.78), page 14, line 28 - page 15, line 5; fig.20	3
A	US, A, 3 568 132 (JOHNSON) 02 March 1971 (02.03.71), column 2, line 41 - column 4, line 20	4
A	US, A, 4 347 460 (LATASSA) 31 August 1982 (31.08.82), column 2, line 24 - column 4, line 4 -----	
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 11 August 1994 (11.08.94)		Date of mailing of the international search report 22 August 1994 (22.08.94)
Name and mailing address of the ISA/ AT AUSTRIAN PATENT OFFICE Kohlmarkt 8-10 A-1014 Vienna Facsimile No. 1/53424/535		Authorized officer Schlechter e.h. Telephone No. 1/53424/448

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR 94/00072

In Recherchenbericht angeführtes Patentdokument Patent document cited in search report Document de brevet cité dans le rapport de recherche	Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
DE A1 4121281	07-01-93	keine - none - rien	
DE A1 4027783	30-04-92	CA AA 2050372 CN A 1063179 EP A1 474065 JP A2 5121045 US A 5243256	04-03-92 29-07-92 11-03-92 18-05-93 07-09-93
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DE A1 2724528	14-12-78	DE C2 2724528	16-10-84
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US A 4347460	31-08-82	CA A1 1144976 DE A1 3106892 FR A1 2477318 FR B3 2477318 GB A1 2070854 GB B2 2070854 NL A 8100995	19-04-83 07-01-82 04-09-81 14-01-83 09-09-81 08-08-84 01-10-81